E. P. GRAY.

CHECK VALVE.

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965,178.

Patented July 26, 1910.

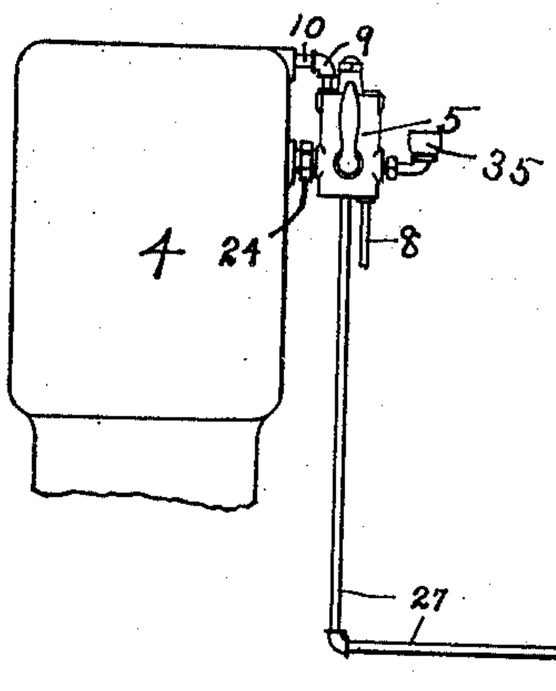


Fig. 1.

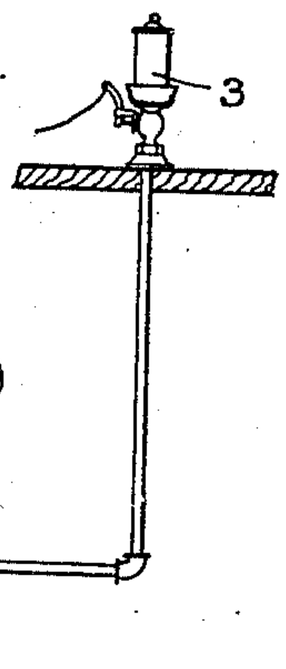


Fig. 4.

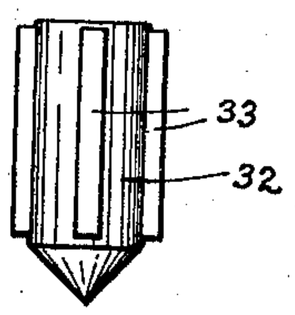


Fig. 5.

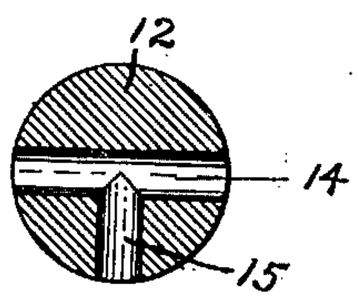


Fig. 2.

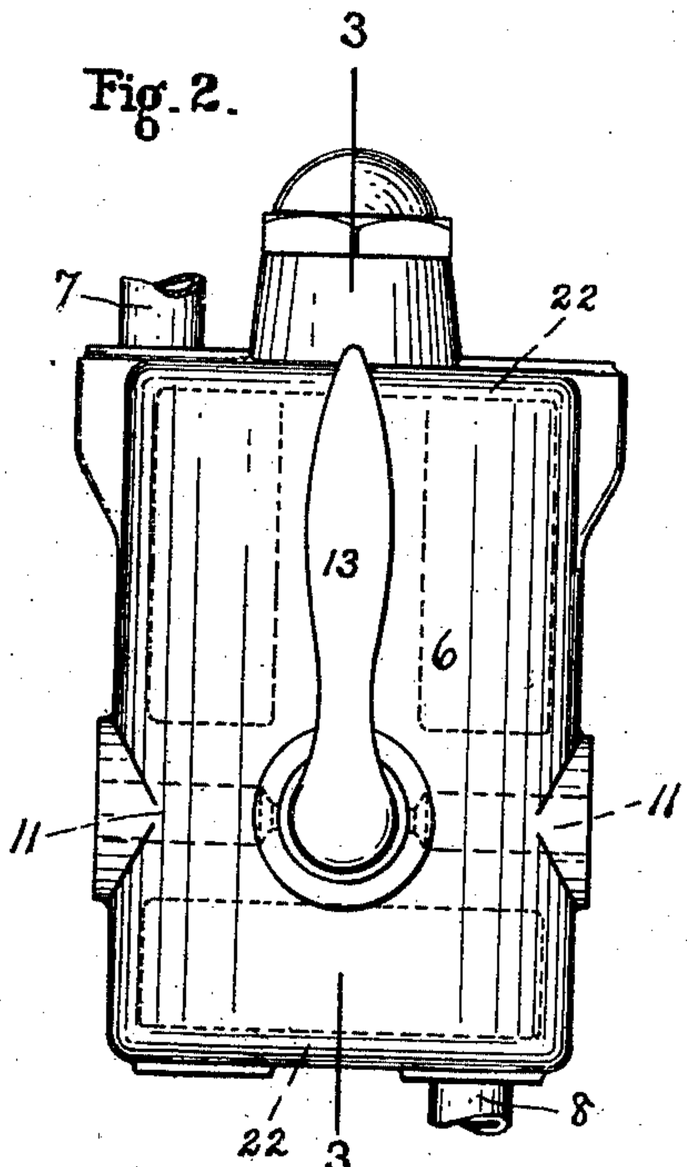
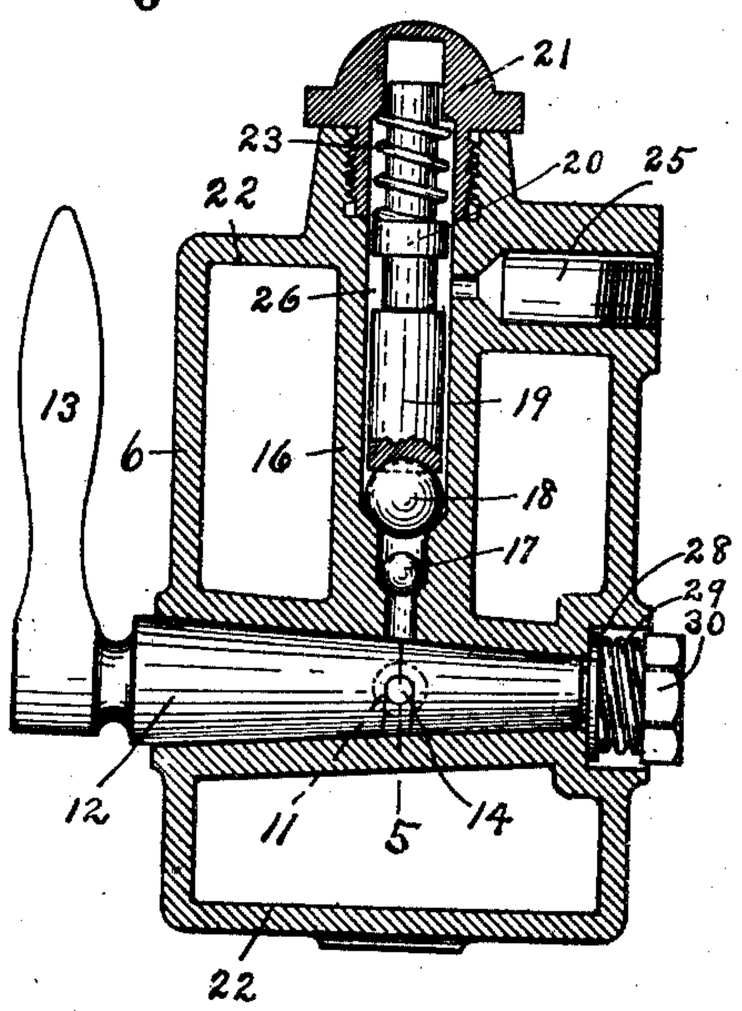


Fig. 3.



Witnesses:
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UNITED STATES PATENT OFFICE.

EMMET P. GRAY, OF DETROIT, MICHIGAN.

CHECK-VALVE.

965,178. Specification of Letters Patent. Patented July 26, 1910.

Application filed January 30, 1909. Serial No. 475,109.

To all whom it may concern:

Be it known that I, EMMET P. GRAY, a citizen of the United States, and residing at Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Check-Valve, of which the following is a specification.

This invention relates generally to a device adapted to be attached to the cylinder of an explosion engine and its object is to provide a check valve which will permit the passage of a portion of the burned gases from the cylinder to a storage chamber and to prevent the return.

A further object of this invention is to provide a check valve for this purpose so constructed that it may be kept properly cooled, so that it will prevent the passage of a flame; which can also be used as a relief valve for the engine cylinder; and which may be entirely shut off.

This invention is embodied in the construction shown in the accompanying drawing in which—

Figure 1 shows a general installation of a signal system embodying my improved check valve. Fig. 2 is an elevation of the check valve on a larger scale. Fig. 3 is a cross section of the same on the line 3—3 of Fig. 2. Fig. 4 is a view of a valve which may be used with this construction. Fig. 5 is a cross section on the line 5 of Fig. 3.

Similar reference characters refer to like parts throughout the several views.

Launches propelled by explosion engines must be equipped with whistles and a storage cylinder for compressed air or other gases has been found to be a very desirable part of the launch equipment. This storage chamber may be charged with compressed air by means of a pump or with burned gases from the engine. The gases from the engine often contain explosive material and the flame of a subsequent explosion sometimes ignites the explosive mixture in the storage tank which results in considerable damage. The valve shown in the drawings is so constructed that a flame will not pass the same. It is also provided with a chamber which may be connected into the cooling system for the explosion engine cylinder so that the heat of the burned gases will not burn out the valve. It is also so constructed that a priming cup or funnel may be connected thereto.

In the drawings 1 is a storage receptacle for the gases under pressure, 2 is a gage to indicate the pressure, 3 is the whistle, 4 is the engine cylinder and 5 the check valve. A right-and-left nipple 24, preferably of steel and having a hexagon, may be used to connect the check valve to the engine cylinder.

The check valve has a body in the form of a horizontal cross and with vertical central stem, inclosed by a cylindrical shell 6 having heads 22, into which heads are connected the pipes 7 and 8 of the cooling system of the engine. The elbow 9, and a right-and-left nipple 10 connect to the water space around the cylinder and the pipe 8 connects to the circulating pump or any other portion of the cooling system as may be desired. A passage 11 extends across through the body of the valve and connects with a tapering bore which receives the tapering plug 12 having a handle 13. A cross section of this plug, shown in Fig. 5, is that of the ordinary three-way valve, and it will be seen that there are three positions in which the plug may control the passage of the burned gases. When the plug is in the position shown in Fig. 2 the burned gases from the engine will flow through the passage 11 and the port 14. When the valve is in this position, the engine may be primed by pouring gasolene into the cup or funnel 35 which screws into the outer end of the passage 11. There is no possibility for the explosive liquid passing to the tank 1. At this position, the construction can also be used as a relief valve for the engine. When it is turned one-fourth of a revolution to the right, that is when the handle 13 extends to the right, the passage 11 to the cylinder will be open, the passage to the outside closed, and the ports 15 and 14 will conduct the burned gases upward on the way to the tank. When the handle 13 extends to the left, all the passages will be closed.

A central body portion 16 of the valve has a bore 26 in which are formed valve seats for the spherical valves 17 and 18. The valve 18 is held down by a piston 19, which in turn is held down by a stem 20, the upper end of which is guided by the cap 21 that screws into the upper head 22 of the body 6. A spring 23 holds down the stem 20 and the piston 19. This spring should be stiff enough to resist the compression of the explosive mixture previous to explosion. The parts 19 and 20 may be integral if desired.

A passage 25 connects to the bore 26 and into this passage 25 is secured one end of the pipes 27 which connect to the receptacle 1. The bore 26 is sufficiently larger than the piston 19 and the ball 18 to permit the passage of a thin film of burned gas, but not sufficiently large to permit the passage of a flame. This clearance should be less than one one-hundredth of an inch. The smaller ball 17 tends to break the inrushing gases into a thin sheet.

A washer 28, spring 29 and nut 30 on the end of the plug 12 are adapted to properly hold it in position. The heads of the shell 6 are shown formed with shoulders which may be drilled and threaded to receive the pipes 7 and 8 so that the valve may be turned in any desired position but these shoulders may be omitted if desired.

In place of balls and piston 19, a valve 32 having guide strips 33 or any other desirable valve may be employed. The strips 33 in Fig. 4 however are greatly exaggerated to bring out the details. Many changes may be made in the details of this construction without departing from the spirit of this invention.

While the construction shown in Fig. 1 is primarily a signal system for launches, it will be readily seen that it is adapted for the compression system of the "self-starting" mechanism of automobiles, and where an explosion engine is used to propel railway cars, this construction may be employed to supply fluid under pressure to air-brakes.

When the valve has been employed as a priming device, the plug 12 may be positioned as shown in Fig. 5, during a few explosions of the engine. As a result the gasolene remaining in the passage 11 and the ports will be dried out and not pass to the tank 1. When the handle is turned to close the passages the other parts can be taken out and the interior of the check valve cleaned, although the engine may be running.

Having now explained my improvements what I claim as my invention and desire to secure by Letters Patent is:—

1. A check valve comprising a body portion and a shell having closed ends inclosing the body portion, pipes for cooling liquids screwed into said ends, said body portion having an intake passage and two outlet passages, a three-way valve to control the flow of fluids through said passages, and a valve to prevent the return flow of fluids through one of said passages.

2. A check valve comprising a body having a bore, a valve seated in said bore, the space between the wall of said bore and the valve being less than sufficient to permit the passage of a flame.

3. In a check-valve, the combination of a body having a longitudinal bore and a transverse bore at right angles to the same, a three-way valve mounted in said body to control the flow of fluids through the same, a priming cup attached to said body at one end of the transverse bore, a valve mounted in the longitudinal bore, and a spring in said longitudinal bore to hold the valve on its seat, said body having a lateral passage connecting to said longitudinal bore.

4. In a check-valve, the combination of a body having a longitudinal bore and a transverse bore at right angles to the same, a three-way valve mounted in said body to control the flow of fluids through the same, a priming cup attached to said body at one end of the transverse bore, a valve mounted in the longitudinal bore, and a spring in said longitudinal bore to hold the valve on its seat, said body having a lateral passage connecting to said longitudinal bore and a chamber and connections for circulating liquids.

5. A safety check valve comprising a cylinder, a piston-like check-member slidably arranged therein, the outer wall of said check-member being in close proximity to the inner wall of the cylinder, so as to provide an extremely thin or narrow gas-passage, substantially as and for the purposes set forth.

6. A safety-check-valve comprising a cylinder, a spring-actuated piston-like check-member slidably arranged therein, the outer wall of said check-member being in close proximity to the inner wall of the cylinder, so as to provide an extremely thin or narrow gas-passage, substantially as and for the purposes set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

EMMET P. GRAY.

Witnesses:
EDWARD N. PAGELSEN,
ELIZABETH M. BROWN.